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13. ABSTRACT (Maximum 200 words)  We present the results of a series of studies on the optical properties of GaN and AlGaIn/GaN heterostructures using a variety of spectroscopic techniques. Strain effects were found to have a strong influence in determining the energies of excitonic transitions. The observations of spectral features associated with the transitions involving the ground and excited excitation states make it possible to directly estimate binding energy for the excitations in GaN. Optical pumping experiments were performed on AlGaIn/GaN separate confinement heterostructures (SCH) grown on sapphire by MBE and SiC by MOCVD. the threshold pumping powers were found to be an order of magnitude lower than that for regular GaN epilayers. Nonlinear four-wave-mixing experiments were carried out in both femtosecond and picosecond regimes to study the intensity and time response of scattering efficiency, as well as the pump-induced nonlinear refractive index change.				
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# FINAL REPORT

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**Dr. Mike Prairie**

**Project Title:  
(AASERT)**

**MBE Growth & Characterization  
of GaN/AlN Structures Under  
Hydrostatic Pressure**

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**DEGREES COMPLETED**

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Linear and Nonlinear Spectroscopy of Selected Compound Bulk and Quantum-Confined Structures

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X-Ray Diffraction Characterization of Epitaxial Thin Films